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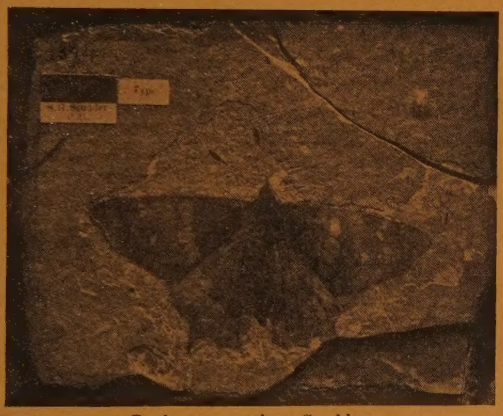

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PSYCHE

VOL. XXIII OCTOBER, 1916 No. 5

SARCOPHAGIDÆ OF NEW ENGLAND, III, *SARCOFAHRTIA RAVINIA*, NEW GENUS AND NEW SPECIES.

By R. R. Parker.

Sarcofahrtia Gen. nov.

Genotype: *Sarcofahrtia ravinia* sp. nov.

(♂ and ♀.) Rows of frontal bristles not extending below base of vitta and parallel to its sides, except that last one or two pairs may be slightly divergent, uppermost frontal bristle in male not stronger than those immediately beneath and not strongly directed backward, front much broader in females; gena without a row of hairs, hair-like bristles or bristles near lower eye orbit (vestiture sparse and minute in type species); vestiture of back of head black throughout. Epaulets light colored (brownish and light yellowish or only yellowish) vestiture of tibiæ short; three pairs posterior dorsocentrals; two notopleurals; apical bristles absent;[1] lower sternopleura with bristles only. Sides of second and third ventral plates in the male overlapped by ventral edges of corresponding nota (usually the second, third and fourth in females). First genital segment (notum) of male consisting of the fused sixth and seventh abdominal segments (nota) and "humpbacked" in profile (Fig. 3).

[1] In the Sarcophagidæ of New England, I (Proc. Boston Soc. Nat. Hist., V. 35, No. 1, p. 25), the writer defined apical bristles as a "pair of bristles inserted at the apex of the scutellum, sometimes crossing and usually weaker than those next to them laterally." It is his opinion that in this group of flies, it is best to consider the terminal bristles of the scutellum as apical only when they are weaker than the next lateral pair. The designation of apical is sometimes a matter of slight difference in position and its significance seems lost unless the above idea is adhered to. The most posterior pair in this genus (*Sarcofahrtia*) are much the strongest and the designation "apical" as of possible application would be a matter of personal fancy, but by the definition given above there is no possibility of misunderstanding, especially when it is desired to refer to their presence or absence. This fact is mentioned because Villeneuve has described a genus *Blæsoxiphella* in which he notes that the "apical" bristles are the longest (Annales Musei Nationalis Hungarici, Vol. 10, p. 613, 1912).

This genus is of particular interest because of its apparent relationship to other Sarcophagid genera. This relationship is indicated in the generic and specific names of the type species. The following paragraphs bring out the main points of resemblance.

Sarcofahrtia and *Wohlfahrtia*. Vestiture of back of head black throughout, epaulets brownish and light yellowish or only yellowish, three posterior dorsocentrals; two notopleurals; apical bristles absent; lower sternopleurals with bristles only; abdomen of male almost elliptical; sides of second and third ventral plates (usually second, third and fourth in females) overlapped by ventral edges of corresponding nota; first genital segment of male "humpbacked" as seen in profile and consisting of the sixth and seventh abdominal segments (nota) fused; fourth ventral plate of male without lamellæ; spiracles of abdominal nota on each side in a straight longitudinal line parallel to long axis of abdomen.

The lack of a row of hairs, hair-like bristles or bristles on the gena near the lower eye orbit is also similar to the species of *Wohlfahrtia* studied, though in the latter genus the gena is often entirely naked. The membrane connecting the notum of the first genital segment to the abdomen in the male is very short in both genera; this is radically different from the condition which exists in most species of *Sarcophaga* in which the genital segments can often be pulled well out from the end of the abdomen. The character of the vestigial remnant of the ventral plate of the sixth abdominal segment is the same as that noted for *Wohlfahrtia* (Parker, l. c., p. 18).

Sarcofahrtia and *Ravinia*. Rows of frontal bristles parallel to sides of vitta except that lower one or two pairs may diverge slightly (in *Sarcofahrtia* do not extend below base of vitta and only in a few species of *Ravinia*); epaulets brownish and light yellowish or only yellowish; vestiture of all tibiæ short; apical bristles absent; lower sternopleura with bristles only; base of forceps without upward flap-like extensions.

The general appearance of the head, viewed from in front, is strikingly alike in *Sarcofahrtia ravinia*, *Ravinia communis* R. Parker, *R. peniculata* R. Parker and *R. hæmatodes* Meigen. This is emphasized in the males by the fact that the sides of the frontal vitta are noticeably "drawn" toward each other at the base, and in both sexes by the sharp delineation of the vitta. The forceps prongs

in *Sarcofahrtia* are spread as in *Ravinia* and particularly resemble those of *R. latisetosa* R. Parker. The parts of the penis are readily homologized with those of *Ravinia*, especially *R. communis*. The whole structure, however, is not so similar to that of this species of *Ravinia* as are those of *Wohlfahrtia opaca* (Coquillett) and *W. chittendeni* (Coquillett).

The comparison given above is based on the following species: *Sarcofahrtia ravinia*, *Wohlfahrtia opaca*, *W. chittendeni*, *Ravinia communis*, *R. peniculata*, *R. latisetosa*, *R. quadrisetosa* (Coquillett), *R. hæmatodes* Meigen, *R. xanthopyga* (Van der Wulp) (?) and several undescribed species of this genus.

The resemblance of *Sarcofahrtia* to *Sarcophaga* is merely one of general appearance. Some characters are similar to those of *Agria* and *Sarcophagula*.

The comparison of these genera seems worth while and illustrates the fact previously suggested by the writer concerning generic characters among such patently closely related genera as many of those of this group (Parker, l. c., p. 32). This suggestion may be briefly summed up by saying that the diagnostic value of any particular generic character is not to be found in that character of itself, but is due to the particular set or group of other characters with which it is associated. One might almost say of this group that one character alone is not generic, and that it becomes so only when associated with others that limit its application.

It is doubtful if all possible characters have been included in the generic description. Among those of doubtful rank may be mentioned, palpi dull orange; uppermost pair of frontals in female not noticeably, if at all, farther apart than preceding pairs (they are farther apart in other genera discussed, except *Agria*).

Sarcofahrtia ravinia sp. nov. (Fig. 1, page 137.)

(♂ and ♀.) Second and third antennal segments pinkish orange (usually, not habitually); palpi dull orange; hairs fringing calypters dark at bend, anterior face of posterior femur with two rows of bristles only, a lower and an upper; posterior surface of middle tibia of male with a single bristle on the middle line distal to the center (two others are present in females, but are more proximal and close to the median dorsal ridge); submesotibial bristle absent in male. Forceps of male with prongs spread from near base (*Ra-*

vinia-like). First genital segment (notum) of female not divided into two lateral lips.

(♂.) Length, 7 to 11 mm.

Head: Viewed from side parafrontals and genæ with dark reflections. Breadth of front at its narrowest part about three-sevenths eye width; cheek height about one-fourth that of eye. Front prominent; frontal vitta at its narrowest part usually greater than twice the width of each parafrontal, its sides drawn in at base and converging backward in a slight curve. Second and third antennal segments pinkish orange; third one and one-fourth to one and one-half times length of second; arista shortly plumose to beyond middle, hairs on lower side continuing farthest outward. Palpi, dull orange. *Chætotaxy.* Lateral verticles absent, virbrissæ inserted on line of oral margin.

Thorax: Metanotum clothed with short, reclinate bristles. Hairs covering anterior spiracle usually dark above, light toward base of spiracle, or base of hairs dark and tips light; those of anterior margin of posterior spiracle may be dark below and light above or almost entirely light colored; those of spiracular cover very light and often tinged with brown centrally at base.

Wings: Bend of fourth vein essentially a right angle; anterior cross-vein slightly more basal than end of first longitudinal; third vein with bristles near its base that may extend more than half way to anterior cross vein; costal spine short; section III of costa at least equal to section V; fifth vein continued beyond junction with posterior cross-vein; alulæ fringed with hair; calypters whitish: but posterior one is often more or less smoky, margin with dark hairs at bend at least, otherwise the fringe white.

Legs: Dark; vestiture short, except under side of coxæ, trochanter with a distinct apical spine: femur more or less spindle shaped; anterior face with two rows of bristles only, an upper and a lower; posterior face with a ventral row of slender bristles that are at least as long as those of lower row of anterior face, well differentiated centrally and extending distally to beyond middle of femur: tibia with a single bristle on anterior face (besides those close to median dorsal ridge) just distal of the middle and nearest the lower side: tarsus slightly shorter than tibia. Anterior and posterior ventral rows of bristles of middle femur developed on proximal half only or thereabouts, distal portion of posterior row

is represented by a short "comb;" submesotibial bristle absent; posterior surface of tibia with a single bristle, this on its middle line on distal half (no bristles on this surface near median dorsal ridge). Ventral surface of anterior coxa with two irregular rows of bristles, one at each side: tibia with a single bristle on posterior surface distal to center and on middle line. *Chætotaxy.* The two posterior pairs of anterior dorsocentrals are scarcely, if at all, weaker than the two anterior pairs of postsuturals, one or two weaker and sometimes inconspicuous pairs anterior to these; acrostichals absent; inner presuturals absent: three pairs posterior dorsocentrals, last somewhat the strongest; prescutellar acrostichals present; usually four sternopleurals, sometimes two, three or five; subnotopleurals slender, but distinct.

Abdomen: Outline almost elliptical; nota clothed above with short reclinate bristles, beneath with longer almost erect hair. Vestiture of the three ventral plates practically of same length and not short. Spiracles of nota on each side in a straight line, the rows parallel to longitudinal axis of abdomen and to each other. Fourth segment may or may not be wholly or in part of same color as genital segments. *Chætotaxy.* Second segment with weak, inconspicuous, decumbent marginal bristles; third with two, only occasionally with weaker ones between these and laterals, latter become more slender ventrally but extend well toward ventral plate, fourth with complete row ending ventrally at forward turn of margin.

Genital Segments: Large, protuberant, filling entire opening of fourth segment and notum fits them closely; dull orange, sometimes yellowish pollinose: first, much larger than second; normally with two rows of bristles, first just anterior to line of fusion of sixth and seventh nota, second on posterior margin, either row may be absent, when both are present those of marginal row the weaker; vestiture sparse and only on posterior half of sixth notum, an irregular line of minute bristles anterior to first row of bristles; in profile showing a more or less distinct "hump:" second, in normal position directly beneath first, and appears discoidal (when segments are pulled out is more triangular in profile); vestiture sparse, scarcely longer than that at first. Forceps (rarely exposed); small, base without upward flap-like extensions, prongs attenuated, tips darkened and bent slightly forward but not approaching each other.

Genitalia: Fourth ventral plate same color as genital segments, without lamellæ, almost naked. Accessory plates seem to be linear processes from second segment that extend forward from near base of forceps and then turn inward and downward. Anterior claspers stubby, ends bent forward and slightly expanded; posterior claspers slender, hooked forward at tips, often retracted within second segment and not visible. For structure of penis see Fig. 6.

Females differ from males in following important characters.

Head: Breadth of front at its narrowest part about equal to eye width, cheek height two sevenths to one third of eye. Just below ocellar triangle frontal vitta fully twice as wide as each parafrontal, much broader than in male, its sides parallel and distinctly delineated to posterior extremity of the triangle. Third antennal segment broader and thicker than in male and prominently marked with sensory organs. *Chætotaxy.* Last pair of frontals (stronger than preceding pairs and directed backward and outward) on same transverse line as greater ocellars.

Wings: Bend of fourth vein slightly acute; costal spine slightly stronger than in male.

Legs: Ventral row of bristles of posterior face of hind femur confined to proximal half; tarsus fully as long as tibia. "Comb" absent on middle femur; posterior face of tibia with two additional bristles that are near median dorsal ridge, submesotibial bristle present. *Chætotaxy.* That of mesonotum somewhat more reclinate.

Abdomen: Oval in outline, clothed throughout with short reclinate bristles. *Chætotaxy.* Marginals of second segment even less conspicuous than in male; laterals of second and third segments extend to ventral plate but are short and decumbent.

Genital Segments: Not protuberant. Fifth ventral plate wider than fourth and of same color as genital nota. Fifth notum (first genital segment) not divided into lateral lips, narrow, fringed with bristles; spiracles scarcely visible (concealed by fourth notum), well below center. Notum and sternum of second genital segment prominent.

Described from nine male and two female specimens.

Type: Massachusetts Agricultural College, Amherst, Mass., male and female. *Paratypes:* United States National Museum, Wash-

ington, D .C., one male, one female; Gypsy Moth Laboratory, Melrose Highlands, Mass., four males; collection of H. E. Smith, one male; collection of R. R. Parker, two males.

Range: New England. Massachusetts: Lunenburg (R. T. Webber), North Andover (D. C. Clemons), Melrose Highlands (D. C. Clemons), Wareham (Dr. Franklin). New Hampshire:

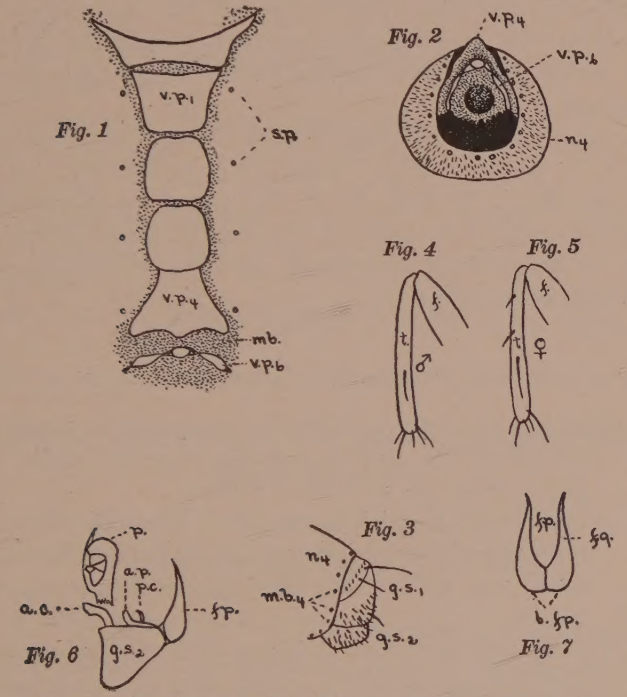

Fig 1. *Sarcofahrtia ravinia* (For explanation, see p. 138.)

Franconia (Mrs. Slosson). Connecticut: Hamden (B. H. Walden). Inclusive dates of capture, May 20 and August 20.

The most important points for discussion have been considered following the generic description. The following may also be noted. The most distal bristles of the lower row of the anterior face of the third femur in males is not habitually the strongest as in most species of *Sarcophaga;* as a rule there are other stronger bristles in this row. The rows of bristles on the first genital segment are very inconstant; the first row may be lacking, may consist of two stout bristles at the center or there may be an additional

pair lateral to these (four in all); the bristles of the marginal row are more slender and may also be lacking. Both rows were not absent in any specimen examined by the writer. The connection membrane between the genital segments has less play than in most species of *Sarcophaga* and is scarcely discernible. The accessory plates somewhat resemble these of the tsetse flies as regards their apparent position. Due to the fact that the ventral edges of the third and fourth abdominal nota overlap the third and fourth central plates these are not plainly visible as in the genus *Sarcophaga*.

The writer is indebted to the United States National Museum, to Mr. A. F. Burgess of the Gypsy Moth Laboratory at Melrose Highlands, Mass., to Prof. H. T. Fernald of the Massachusetts Agricultural College at Amherst, and to Mr. H. E. Smith of the Bureau of Entomology Laboratory at West Springfield, Mass., for the loan of material.

EXPLANATION OF FIGURE 1. *Sarcofahrtia ravinia* sp. nov.

Fig. 1. Showing character of ventral plates, of sixth ventral plate (sternum) and position of spiracles; the sixth ventral plate pulled out of normal position.

Fig. 2. End of abdomen with hypopydium removed and showing normal position of sixth ventral plate (membrane folded back and sixth plate lies above fourth taxonomic plate).

Fig. 3. Profile view of end of abdomen with genital segments in their normal position. Note line of fusion of sixth and seventh abdominal nota and the two rows of bristles.

Fig. 4. Posterior surface of middle tibia of male showing one bristle.

Fig. 5. Posterior surface of middle tibia of female showing two bristles in addition to the one found in the male.

Fig. 6. Profile view of second genital segment, forceps, penis and claspers.

Fig. 7. Posterior view of forceps. Note base without upward flap-like extensions and the spread forceps prongs (*Ravinia* like).

ABBREVIATIONS.

a.c. = anterior claspers.
a.p. = accessory plate.
b.fp. = base of forceps.
f. = femur.
fg. = forceps prong.
fp. = forceps.
g_1 and g_2 = first and second genital segments.
n_4 = fourth notum.
$n^6{}_4$. = marginal bristles of fourth notum.
mb. = membrane.
p. = penis.
p.c. = posterior claspers.
sp. = spiracles.
t. = tibia.
v.p.$_1$, v.p.$_4$, v.p.$_6$ = first, fourth and sixth ventral plates.

TAXONOMIC NOTES ON AGATHINÆ (HYMENOPTERA-BRACONIDÆ).

BY J. CHESTER BRADLEY,
Cornell University, Ithaca, New York.

A NEW DEFINITION OF CRASSOMICRODUS ASHMEAD.

A study of the type of *Microdus fulvescens* Cresson, designated by Ashmead as type of his genus Crassomicrodus (Proc. U. S. Nat. Mus., vol. 23, p. 128, 1900), reveals the fact that in this species the hind wings have no closed discoidal cell and the longer spurs of the posterior tibiæ are decidedly less than one half of the length of the metatarsi. These are the characters upon which Ashmead based his genus and by which he separated it from Epimicrodus. The designated type of the latter genus is *Microdus diversus* Cresson, undoubtedly, as Mr. Viereck has already pointed out, a misprint for *divisus* Cresson, since Mr. Cresson never described a Microdus under the name *diversus*. Moreover *divisus* agrees well with most of the characters assigned by Ashmead to the genus Epimicrodus.

Microdus fulvescens Cresson agrees generically in all respects with *Microdus divisus* Cresson, of which I have also examined the type. It is, therefore, necessary to unite the two genera. Crassomicrodus has page priority and will, therefore, take precedence over Epimicrodus.

Spilomicrodus Cameron possesses the characters erroneously assigned to Crassomicrodus by Dr. Ashmead in his key (*loc. cit.*) and should, therefore, replace the latter name in that key, while Crassomicrodus should there replace Epimicrodus.

Crassomicrodus Ashmead.

1900. *Crassomicrodus* Ashmead. Proc. U. S. Nat. Mus. 32:128. (Type: *Microdus fulvescens* Cresson.)

1900. *Epimicrodus* Ashmead. Proc. U. S. Nat. Mus. 32:129. (Type: *Microdus diversus* [sic] = *divisus* Cresson.)

Malar space short, or only slightly lengthened, not rostriform as in Agathis; maxillary palpi slender, five-segmented, the second segment slender; parapsidal furrows distinct; mesopleural furrow strong, foveolate; propodeum not areolated, its spiracles small and round. First and second discoidal cells separate; second cubital cell petiolate, small and triangular; hind wings without a closed discoidal cell. Longer hind tibial spur less than one half the length of the metatarsus; claws large, simple; ovipositor not exserted.

The Generic Position of Two Cuban Agathinæ.

Microdus fasciipennis Cresson, of which I have examined the type belongs to Zelomorphidea Viereck, a subgenus of Zelomorphus. Mr. Viereck has ventured the suggestion that all the South American Disophrys probably belong to Zelomorphidea, and in the main I suspect that he is correct. Nevertheless *Agathis cubensis* Cresson, of which I have also studied the type, is more closely allied with Disophrys than with any other described genus, and should be placed in that genus pending an opportunity for a critical revision of the genera of Agathinæ. Its claws are cleft, its areola quadrate, its face elongate, rostriform, and its hind legs stout.

NOTE ON GENUS HYOIDEA PUTON (HEMIPTERA).

By E. P. Van Duzee,
Berkeley, California.

Mr. Otto Heidemann has very kindly sent to me for examination a cotype of *Hyoidea horvathi* Montd. and a careful examination of this confirms my assignment of this genus and *Bolteria* Uhler in my synoptical tables of the Miridæ recently published by the University of California and in the Check List of the Hemiptera, in both of which I drop *Hyoidea* as wanting in our fauna and arrange *Bolteria* in the Phylini near *Plagiognathus*. Dr. Reuter did not know *Bolteria amicta*, the type of the genus, but placed *picta* in *Hyoidea* and described a new species *grisea*. An examination of fresh material of *picta* shows that it wants the free converging arolia found in *Hyoidea* and must be placed in Subfamily Phylinæ. It is probably safe to assume that *amicta* is congeneric with *picta* although the type is lost and so far as I know the species is now unrecognized.

I am also indebted to Mr. Heidemann for the opportunity of examining typical examples of *Hyoidea grisea* Reuter, and, as Mr. Heidemann suggests in his letter to me, this proves to be a synonym of *Labopidea chloriza* Uhler. I am, however, convinced that both *chloriza* and *grisea* are identical with the earlier described *Tinicephalus simplex* Uhler and that we must use the generic name *Labopidea* for the species. *Hyoidea* differs from *Labopidea* in having a more polished surface with punctured pronotum, a longer and more parallel form with the pronotum but little wider behind, and a sharp and carinate hind margin to the vertex. The aspect of *Hyoidea* is quite different from *Labopidea* and I believe it should be considered distinct. Both of these genera have free converging arolia and belong to the Orthotylini.

NOTE ON THE BRAZILIAN FIRE-ANT, *SOLENOPSIS SÆVISSIMA* F. SMITH.

By William Morton Wheeler.

While discussing the various North American forms of *Solenopsis geminata* Fabr. in a recent paper[1] I stated that the ant described many years ago as *Myrmica sævissima* by Frederick Smith from specimens taken by Bates at Pará, is, in all probability, identical with the one later called *Solenopsis pylades* by Forel. My reasons for making this statement were these: "In the first place, Smith's description is unusually good and applies perfectly to the typical yellow *pylades*. In the second place, his specimens were received from Bates, who gives an interesting account of the habits of this 'fire-ant' in Brazil. Moreover, Mr. W. M. Mann, who collected extensively in the region where Bates collected his specimens and made his observations, tells me that it is there the only common and widely distributed *Solenopsis*, and the numerous specimens collected by Mr. Mann prove to be the typical *pylades* Forel." Forel, however, will not assent to this opinion.[2] He says that Smith mentions a worker major and a worker minor in his description, whereas it was precisely the feeble polymorphism of the worker that led to the separation of *pylades* from *geminata*. Surely Forel, who has had to spend so many precious hours in the interpretation of Smith's inadequate and faulty specific descriptions, ought not to regard his statements concerning major and minor workers as meaning anything more than a perceptible difference in size. My critic, however, completely ignores the second and third points of my contention, which to me seemed to be the more important.

In order to settle the matter, I sent several specimens of the typical yellow *pylades* Forel, taken by Dr. Mann at Pará, to my friend, Mr. Horace Dornisthorpe, with the request that he compare them with the types of Smith's *sævissima* in the British Museum. He writes me under date of July 3 as follows: "I compared

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[1] Some Additions to the North American Ant-Fauna. Bull. Amer. Mus. Nat. Hist., 34, 1915, p. 395.

[2] Fourmis du Congo et d'autres provenances récoltées par MM. Hermann Kohl, Luja, Mayne, etc. Rev. Suisse Zool., 24, 1916, p. 459.

the ants you sent me with F. Smith's types (two workers on one card, one large, one medium) of *Solenopsis sævissima* at the British Museum on Saturday and they agree perfectly in every way. The types were taken by H. W. Bates at Pará." There can be no doubt, therefore, that Forel's *pylades* is merely a synonym of *sævissima* Smith.

Forel disagrees with me further on the rank of this form, maintaining that it should be regarded as a distinct species and not as a subspecies of *geminata*, because the polymorphism of the worker is very feeble, owing to the complete absence in the colonies of any large-headed forms like those of *geminata*. This is a matter of personal opinion. I called attention to the fact that two of our North American forms, *maniosa* Wheeler and *xyloni* MacCook are in this respect intermediate between *sævissima* and *geminata*, and I may add that the Brazilian form *medusa*, recently described by Mann, is even more polymorphic than *geminata* since its largest workers have the head greatly enlarged and flaring in front, with very strongly curved mandibles. If *sævissima* is elevated to specific rank, these forms should also have the same status, but in my opinion they may all be regarded as so many subspecies of a single variable species. I admit that it might be more logical to include *aurea* Wheeler as still another subspecies, with *amblychila* Wheeler as its variety. Owing to the great accumulation of forms in this section of the genus *Solenopsis* within recent years I am not altogether averse to regarding *sævissima*, *geminata*, *maniosa xyloni*, *electra*, *medusa* and *aurea* as so many different, though very closely allied, species.

AN ANOMALOUS BLIND WORKER ANT.

By William Morton Wheeler.

Several years ago Prof. C. F. Baker sent me from Catalina Island, Calif., a number of ants which I described as *Aphænogaster patruelis* Forel var. *bakeri*. Later he gave me a vial of additional specimens from the same colony. While mounting these I detected among them a single eyeless worker, which seemed to be worth describing and figuring as, to my knowedge, nothing like it has been seen in the genus *Aphanogaster* nor, indeed, in any

other genus of ants possessing well-developed eyes in the normal workers. The workers of *Aphænogaster bakeri*, like those of all the species of the genus, are monomorphic or very feebly polymorphic, and the eyes, though not large, are nevertheless well developed. The exceptional specimen is in all respects normal except in the shape of the head and the absence of visual organs.

a. Head of normal worker of *Aphænogaster patruelis* Forel var. *bakeri* Wheeler. *b*. Head of eyeless worker of same.

The head, as will be seen from a comparison of the figures, is suboblong and the sides, especially at the middle, are very distinctly concave, probably owing to an absence of the optic ganglia. On the left side the integument, where the eye should be, is slightly rugose and presents what appears to be a single minute, pigmented ommatidium; on the right side the integument in the corresponding concavity is smooth and rather pale. That the eyeless individual had been living and working for some time like its normal sisters is shown by its mature coloration and the blunted teeth of its mandibles.

As colonies of *Aphænogaster* contain, as a rule, only a single fertile queen, it is very probable that the anomalous specimen above described and the normal workers are all daughters of the same mother. We may, therefore, assume that the eyeless worker is a mutation, strictly comparable with the eyeless specimens that have appeared in certain cultures of the fly *Drosophila*, and we might infer that the normally eyeless workers and females of such ant genera as *Dorylus* and the corresponding phases of certain species of *Eciton*, in which the eye is reduced to a single ommatidium, arose as similar mutations. We might be tempted, moreover, to extend this inference to other peculiarities of worker ants,

since many such peculiarities are merely suppressions or absences of structures that are well developed in the males and females of the same species. I doubt, however, whether we are justified in drawing such a sweeping conclusion in the face of numerous facts which indicate even more forcibly that the worker characters have arisen from continuous and fluctuating variations. In many genera of ants with polymorphic workers (*Camponotus Pheidole*, etc.) and in many genera containing numerous species, though with monomorphic workers (*Solenopsis*, *Monomorium*, etc.) the eyes show a gradual or serial diminution. Discontinuity may, therefore, be conceived to arise in the development of these structures by a selective survival of certain stages or phases, just as it does in the series of species or of dimorphic workers of the same species. The absence of wings is another character in worker ants which is sometimes supposed to have arisen as a mutation, but, though very rare, anomalous workers with vestigial wings (pterergates) are known to occur. I have recorded and figured such cases in *Myrmica* and *Cryptocerus*, and others have been observed in the former genus by Wasmann and Donisthorpe. Recently I have found an even more instructive case, an Australian *Monomorium*, allied to *M. rothsteini* Forel, the normal females of which have very small wings, too small to be of any service as organs of flight. These females, which will be described and figured in a future paper, are, in fact, truly brachypterous, like certain well-known species of Diptera, parasitic Hymenoptera, Heteroptera and Orthoptera, and suggest that the complete loss of wings in the worker is merely the final stage in a gradual diminution of these organs and has, therefore, originated from continuous variations. As the worker phase of the ants must have been perfected and fixed as a family character not later than the Eocene Tertiary and probably as early as the Cretaceous, it is not surprising that at the present time organs characterizing stages intermediate between the workers and females should be so rarely resuscitated as anomalies.

A NEW BRACHYELYTROUS TROGOSITID BEETLE FROM COLORADO.

By H. F. Wickham,
Iowa City, Iowa.

Nearly twenty years ago, in July, 1897, I spent a few days in the San Juan range of the Rockies, near Ouray, Colo. A considerable number of wood-frequenting species of Coleoptera were taken at that time, most of which were duly indentified and listed in my published catalogue of the beetles of the state, but a single specimen of remarkable aspect foiled all attempts to locate in North American genera. In brachypterous structure, it reminded one of the Staphylinidæ or of certain Nitidulidæ like Conotelus but did not go well into either of these families. Eventually the insect was put aside with a lot of other more or less obscure forms and entirely forgotten, but on looking through some boxes a year ago I came across it again and, after giving it a careful study, decided that the best place for it was in the Trogositidæ (or Temnochilidæ as the family is often called) although no brachyelytrous genera of this group were known from the United States. A little later, while looking over the plates of the volume of the Biologia Centrali-Americana containing the Trogositidæ (Insecta. Coleoptera, Vol. II, Part 1), I recognized my capture as belonging to Cylidrella and very close to *C. mollis* Sharp (t. c., p. 389, Tab. XII, fig. 23).

Both Sharp and Léveillé place Cylidrella in the immediate neighborhood of Nemosoma, to which genus it bears considerable resemblance except in the shortening of the elytra. It might, perhaps, be taken at first sight for a Clerid of the Hydnocera type, but does not look just right in that company. Up to this time, the genus has been monotypic and specimens seem to be very rare. The specimen described by Dr. Sharp, and upon which the genus was based, was an unique brought from Cerro Zunil, Guatemala, by Mr. G. C. Champion who writes me, in answer to a query, that he does not know of its occurrence outside of that country. Certainly not many specimens can have been taken in the United States, or they would have attracted the attention of some of our systematists and have been described long before this. The distribution is of very particular interest as showing another example

of the extension of genera along this great mountain system and we may now expect that Cylidrella will turn up, at considerable altitudes, in forests at intermediate points between Colorado and Guatemala. The Colorado specimen seems to require a new name and I take great pleasure in dedicating it to Mr. G. C. Champion of London, Eng., in recognition of his masterly work, first as a collector and later as a monographer of the Central American beetle fauna. A drawing does not appear to be necessary, since our species so closely resembles the one already known.

Cylidrella championi sp. nov.

Form narrow, elongate, subcylindrical, sides almost parallel. Color castaneous, head nearly black, elytra lighter with a yellowish, ill defined, transversely elliptical common spot, slightly antemedian in position, not reaching the lateral margins and occupying between one fourth and one third of the length, the legs (including the front and middle coxæ but not those of the hind pair), yellowish, posterior femora somewhat infuscate, antennæ yellowish throughout. Head very long, narrowed behind the eyes, the front produced into two large, triangular, toothlike processes which cover the mandibular bases, forehead strongly grooved from the angle of the frontal emargination nearly to the middle of the vertex, where the canal becomes evanescent but reappears shortly as a fine line which again becomes deeper and wider to the base though not attaining the depth or width of the anterior section; surface minutely alutaceous, punctuation fine, arranged in pretty well defined longitudinal rows which are more distinct anteriorly and become confused and coarser at base, the genæ and underside smoother and very sparsely punctured, the latter region polished, shining. Mandibles large, punctured. Palpi yellowish. Eyes round, scarcely prominent. Antennæ with large first joint, second much smaller, funicle apparently of six small joints which are not very well defined and probably permit of little motion, club three-jointed, flattened, the terminal articulation subcircular, the others transverse. Prothorax a little narrower than the head and apparently of about the same length, very gently narrowing posteriorly to the base, side margins finely beaded, especially behind the middle, surface sparsely, finely and irregularly punctured. Elytra at humeri a little broader than the prothorax, gently widening to

behind the middle, apices separately rounding, surface minutely alutaceous, finely punctate in rather obscure rows which fade at tip so that the apical area becomes almost smooth and shining. Abdomen above with four full dorsal segments, as well as the basal lateral portion of another, exposed behind the elytral tips, this uncovered surface being strongly shining and sparsely punctate. The segmental edges have a peculiar laminate appearance, as if folded over. The terminal segment is nearly semicircular in outline and strongly hairy. Underside very shining, sparsely and finely punctured, the prosternal and abdominal apices tinged with yellow. Legs rather slender, the femora and tibiæ flattened, front tibiæ wider, denticulate and strongly hairy, all the tarsi slender, hairy and with large simple claws. Length, if straightened out, nearly 5.00 mm.

Compared with the description of the Guatemalan specimen, this insect is considerably larger, attaining a length of about 5.00 mm., against 3.25 of the southern form. The coloration is also different and there are some diversities in sculpture and structure, which, however, may perhaps be due to unlike interpretation. I think that the funiculus has six joints in *C. championi*, though Dr. Sharp, while admitting difficulty in counting, allows only five in *C. mollis*. He makes no mention of a groove on the posterior half of the head nor of a marginal prothoracic bead.

NOTES ON THE EGG-PARASITES OF THE APPLE TREE TENT-CATERPILLAR (*MALACOSOMA AMERICANUM*)[1]

By L. T. Williams,
Omaha, Nebraska.

The object of the following observations during the spring and summer of 1915 was to make a detailed study of the life-histories of some of the egg-parasites of the apple-tree tent-caterpillar. For reasons which will presently be stated this purpose was not fulfilled; but as some new species were bred from the eggs, a supposedly erroneous record of Ashmead's verified, and some other

[1] Contributions from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 117.

points of possible interest noted, a list of the parasites found, together with some comment on their behavior and relative abundance, seemed to be worthy of publication.

The eggs used for one experiment were separated into four lots, according to the dates of collection and the conditions under which they were kept. Box No. 1 contained about 350 egg-masses, collected between February 20 and March 22, in the immediate vicinity of the Bussey Institution, and kept in a greenhouse until the caterpillars and parasites emerged. Box No. 2 contained about 180 egg-clusters, collected in a locality a few miles south of the first (Stony Brook Reservation, near Hyde Park, Mass.) from June 19 to June 29 (mostly on the earlier date). Box No. 3 contained about 50, collected at the same place as those in Box No. 1, but kept out of doors, so that the exact date on which they were gathered is immaterial. Box No. 4 contained about 60, accumulated in the laboratory from time to time, but, for one reason or another, not placed in the other boxes. The results in these last three boxes were almost indentical.

In addition to these, about 30 egg-masses were collected in early spring and placed in cold storage for the months of April, May, and June. The box containing these was known as No. 5. Six more masses were isolated in test-tubes for individual records.

Caterpillars hatched from the eggs in the greenhouse about two weeks after collection, and the first parasites emerged March 29, or about five weeks after collection. Under natural conditions the first caterpillars appeared April 19, and the first parasites, June 19. An attempt was made to rear the early hatched caterpillars in order to secure their eggs for experiment, but they contracted the wilt disease, and perished to the last individual. It was, therefore, necessary to rely on pupæ collected in the field, and as these were heavily parasitized the number of adults reared from them was small. The first female emerged and laid her eggs on June 29, probably a day or two earlier than it would have done under natural conditions.

Six species of parasites were bred from the eggs. They will be taken up in the order of emergence.

1. *Ablerus clisiocampæ* Ashm., Family Eulophidæ.

Six individuals, males and females, issued in Box No. 1 March 29. It was the most abundant parasite till April 10, when it gave

place to others. May 31 was the date of the last specimens to appear in this box. In all, twenty-two males, twenty-four females and five or six which escaped before their sex was determined issued from this box.

Under natural conditions this parasite was, oddly enough, the last to make its appearance. In Box No. 2 four males and one female issued between July 26 and July 31, over two weeks after all the other species (except for those in the cold-storage box) had ceased to emerge, and in Box No. 3 six females and four males appeared, at about the same time. The total from all the boxes was thus about 66, and the percentage of parasitism, counting 200 eggs to the cluster, was only 0.06 per cent. This is, of course, economically negligible, supposing it to represent typical conditions.

As its name shows, this insect was described as a caterpillar parasite, but as the Aphelininæ, the subfamily to which it belongs, are otherwise exclusively parasites of the Coccidæ, and as it was afterwards reared by Howard and others from *Aspidiotus* and *Chionaspis*, it was naturally assumed that Ashmead had been mistaken. In the present case, not only were the trees from which the eggs were taken practically, if not absolutely free from scales of any kind, but the egg-masses were in all cases removed from the twigs on which they had been deposited and placed in the boxes by themselves. Under these conditions the corroboration of the original record is certainly ample.

So far as I know, there are few parallels to this case among the Chalcidoidea. The exact relationships of this insect to such widely separated hosts would appear to be a problem of considerable biological interest.

The Ablerus is a very attractive little insect, blue-black in color with bright red eyes, which appear, owing to the irridescent cornea, to be surrounded by a band of brilliant metallic blue. The male has not been described, so far as I know. It is smaller and somewhat slenderer than the female. The antennæ are seven-jointed as in the female, but are relatively longer, lack a definite club, and are uniformly straw-colored instead of being banded. The head, testaceous in the female, is dusky in the male, and the wings are completely hyaline whereas those of the female have a distinct median cloud.

2. *Telenomus clisiocampæ* Ashm., Family Scelionidæ.

One male of this Proctotrypoid parasite emerged on March 30, or only one day later than the *Ablerus*. Small numbers of males continued to issue till April 13. After this, females began to appear, and both sexes were found in the tubes till May 31, the males remaining in the majority. Seventy-five males, thirteen females and two or three of undetermined sex issued from this box. In Box No. 2, one male and another, whose sex was not ascertained, issued on June 23. Four were recorded in all. In Box No. 3, one male issued July 1. In Box No. 4 one male and two females issued June 30 to July 3. One male issued in Box No. 5 (cold storage) August 3, or about three weeks after the eggs it contained were removed from the refrigerator and one female August 7. The total number is, therefore, approximately one hundred, or less than 0.1 per cent. of the number of eggs.

This species is very active, especially the male. The female, which is somewhat more sluggish may be superficially distinguished from the male by the clubbed antennæ.

3. *Tetrastichus* sp., Family Eulophidæ.

A single male of this undetermined species issued on March 31. It lived till April 2. This specimen, together with others of unknown or doubtful species, was sent to Mr. A. A. Girault of the United States National Museum, but its condition did not permit him to do more than determine the genus. It seems likely that the species is undescribed.

4. *Oöencyrtus clisiocampæ* Ashm., Family Encyrtidæ.

One female issued in Box No. 1 on April 10. It was followed at intervals by others till April 21, and then did not appear again till May 9. The last one issued June 2. In all ten males, ten females, and three of undetermined sex issued from this box. None came from Box No. 2, and only two (June 30) from Box No. 3. From Box No. 4, one male and three females issued, and from Box No. 5 (cold storage) one female on August 7. This makes thirty in all, less than half as many as the *Ablerus*, to which it comes next in point of numbers.

5. *Tetrastichus* (*sens. lat*) sp., Family Eulophidæ.

A female of this undetermined species issued in Box No. 1 April 13. Others issued in small numbers thereafter till April 29, on which date about a hundred, mostly males, were found in the tube which had been left undisturbed for four days. They continued to issue in considerable numbers till June 2. In Box No. 2, the first individual appeared June 26 and the last July 7, and in Boxes Nos. 3 and 4 the periods of emergence were about the same. In Box No. 5, about eighty issued from the thirty egg-masses between August 2 and August 16.

Quite a large proportion of the parasites failed to find their way into the tubes. In Box No. 4 in particular about five hundred were found in the débris after living insects had ceased to emerge. It may very well be that some fault in the arrangement of the boxes prevented individuals of all the species from emerging, and made the records lower than they would otherwise have been.

No. 5 was the only species to appear in any of the tubes containing the isolated egg-masses. The percentage of parasitism varies from 1 to about 12 per cent., showing that the number taken was too small to justify any definite conclusions, although the average percentage is not far from that of Box No. 4 in which the dead insects were counted. Most of the egg-masses would seem to be attacked, but only a few eggs seem to be parasitized in any one egg-mass.

In spite of the comparative abundance of this species no details of its life-history could be ascertained, except that it passes the winter as a full-grown larva in the host egg, and emerges in June, a few days before the adults of *Malacosoma*. This failure was due to the fact that the insect could not be induced to oviposit in the eggs of its host. On one occasion a moth was secured in the act of laying, and a parasite placed on the egg-mass; but the latter did not oviposit, though it carefully explored the eggs. Finally, the parasites were attracted to the eggs by dipping the latter in syrup, but, as was to be expected, this did not overcome their unwillingness to oviposit. It cannot be stated with absolute certainty that they never did so, as eggs were sometimes left in the tubes while the parasites were not watched. However, observations lasting more than an hour, during which parasites were continually walking about on the eggs, failed to demonstrate any egg-laying

activity on the part of the females. Similar failures were noted in the case of *Ablerus*, *Telenomus*, and *Oöencyrtus*, but the rarity of these insects rendered a fair trial impossible, and the results are accordingly less surprising.

The failure of No. 5 to oviposit normally is the more peculiar in view of the fact that it frequently deposited eggs on the test-tube wall. These eggs, which were rather large, were of the ordinary stalked type. On one occasion some of these eggs apparently developed as far as the first larval stage. These larvæ were much damaged when discovered, and could not be figured or described, but a very distinct segmentation could be made out, and the form appeared to be somewhat flattened.

6. *Aphycoideus io* Girault., Family Encyrtidæ.

Two females issued from Box No. 2 before it had been fitted with a tube. One was found walking about on the laboratory desk, but the other was still in the box, so that there seems to be no reasonable doubt as to their source.

A specimen was sent to Girault, who pronounced it to be a representative of a new genus. Its reddish-yellow color distinguishes it at a glance from any of the other species, all of which are black or very dark.

These observations was undertaken at the suggestion and under the supervision of Professor Brues, whom I wish to thank for his aid during its entire course. Professor Wheeler, Dr. Chapman, and many students of the Department, have also furnished literature, or suggestions. I have already stated that I am indebted to Mr. A. A. Girault for the identification of several of the species.

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MONARTHROPALPUS BUXI LAB. IN NEW JERSEY (DIP.).

By Harry B. Weiss,
New Brunswick, N. J.

This insect, commonly known as the European boxwood leaf miner, has already been recorded by me as occurring in New Jersey (Psyche, June, 1915), (Ent. News, vol. 27, p. 13). Its distribution was at first thought to be rather limited, but it is now known to occur in widely separated parts of the state, namely, Rutherford, Far Hills, Gladstone, Peapack, South Orange and Eatontown and will undoubtedly be found in other places in the future. It was evidently introduced from France or Holland, within the past five years, especially the latter as thousands of boxwood plants are annually imported into New Jersey from that country while, comparatively, only a few come from France. It has also been taken at various times by inspectors examining boxwoods from these countries.

At present, its injuries in New Jersey are confined principally to all varieties of boxwoods growing in nurseries and on private estates. The first sign of injury likely to be noticed by most persons is a small yellowish or light green spot on the upper surface of the leaf. Directly under this on the lower surface is quite a pronounced, irregular, oval blister due to the young maggot enlarging its mine. Later in the season the injury is more apparent and there will be a slight elevation on the upper surface with a yellowish or brownish discoloration. In severe infestations, the entire leaf is taken up by irregular oval swellings which are largest on the under surface. Badly infested plants present during the spring, the superficial appearance of having been winter killed. The leaves are discolored, somewhat brownish and finally drop off. Closer examination however will reveal the larvæ or pupæ within their galls. Inasmuch as boxwood plants have strictly an ornamental value, a plant having unsightly bare branches with new leaves developing at the tips is far from beautiful. Specimen plants which have been trimmed for years in some particular shape are sometimes ruined by the insects infesting an entire side or top.

Infested plants obtained during the middle of April and kept in the laboratory were examined daily and the pupal stage found to last from fourteen to eighteen days. As it was several degrees warmer there than in the open, growth was undoubtedly accelerated. In the open this stage lasted an average of three weeks. In the laboratory, the first adults emerged April 30 and every day following for two weeks, while in the open, the first emergence was on May 20. Inasmuch as the weather varies in different years, it can be safely said that, in New Jersey, the adults appear as a rule during the latter part of May.

According to Professor Chaine who studied the insects at Bordeaux, France, oviposition lasts from two to three weeks, the female depositing the eggs singly in a slit cut by the ovipositor. Young leaves are selected and the eggs deposited at a distance from each other. In the laboratory, oviposition started a couple of days after emergence, the adult females selecting the under surfaces of tender green leaves. Each female would insert the tip of her abdomen in the tissue and sway the body from side to side during the act. The eggs are tiny, oval and translucent, wide at the middle and tapering uniformly toward each rounded end, being about one one-hundred and twentieth of an inch long and twice as long as broad. To the naked eye, they are visible only as white specks. They appear to be laid on their sides in the tissue and the only outward indication of their presence is a slight elevation of the tissue immediately over them, these swellings sometimes being a darker green than the remainder of the leaf. The exact location of each egg can easily be seen by holding the leaf up to the light and examining it with a hand lens. Each light oval spot surrounded by a dark ring means an egg. Several leaves examined in this way were found to contain as many as thirty-three and thirty-five eggs, which were later dissected out. This condition however would prevail only in a cage where many females were forced to oviposit in a few leaves as it was under such conditions that the above numbers were found.

After hatching, which required from two to three weeks in the laboratory, the yellowish white maggots mine the leaves all summer, making small oval pockets which sometimes run together on one side of a midrib if many larvæ are present. The winter is passed in these pockets, the larvæ transforming to pupæ in the

spring. So as to facilitate the emergence of the adult, the pupa issues partly through the thin lower surface of the leaf. An infested leaf may contain from one to twelve and possibly a few more larvæ, although twelve was the largest number taken from a single leaf. The young larvæ are yellowish-white, later becoming yellowish-green when full grown at which time they are about one-eighth of an inch in length. The pupæ also are about one-eighth of an inch long, light orange colored and quite active, while the adults are slender midges with hyaline wings, orange colored bodies and remarkably long legs and antennæ and appear to be fairly strong fliers considering their small size.

Technical descriptions of both sexes and the larva together with suggestions for control can be found in the Thirtieth Report of the State Entomologist of New York by E. P. Felt and need not be gone into here. Considering the damage which this midge is capable of doing and the lack of really efficient remedies together with the fact that even partly injured boxwoods are no longer ornamental, it would appear that the prompt destruction of infested plants before the adults emerge in the spring would be the best plan to pursue.

Explanation of Plate XIII.

Fig. 1. Boxwood leaf with lower surface removed to show larval mines.

Fig. 2. Leaves showing galls and empty pupal cases of the midges.

Fig. 3. Leaf showing distribution of the eggs in the tissue, when many females are forced to oviposit in a few leaves.

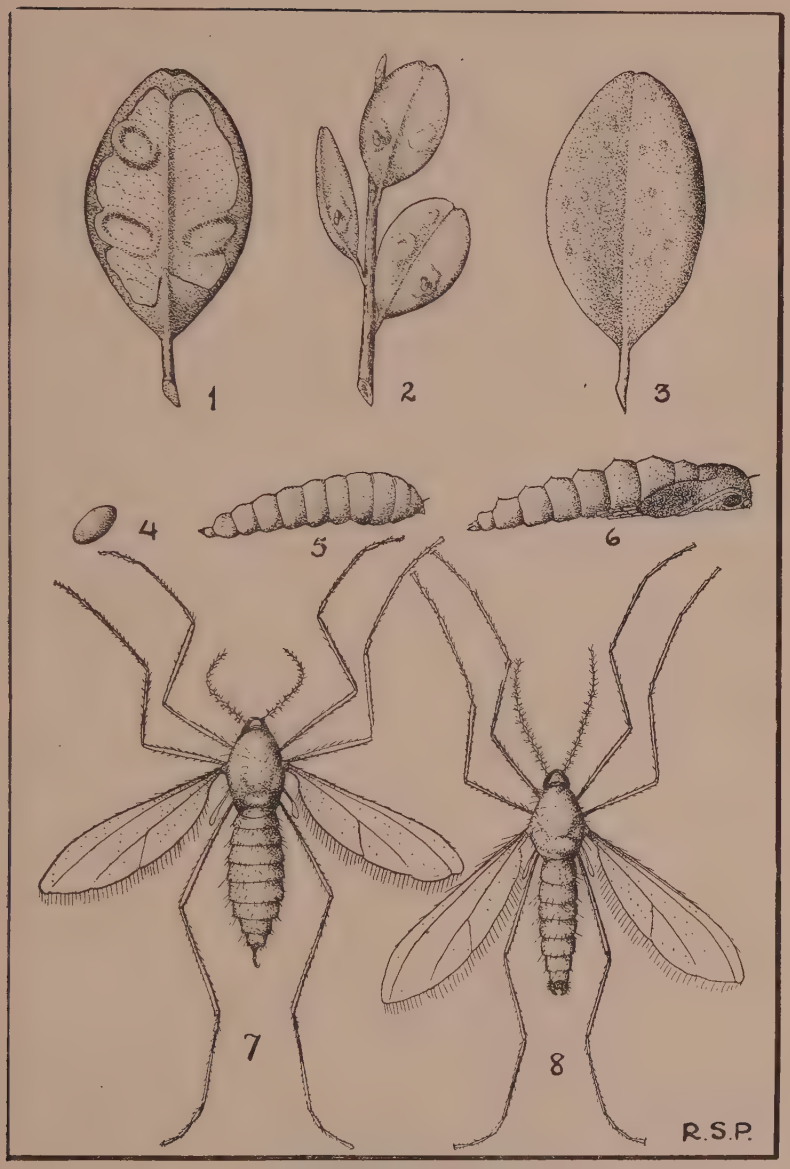
Fig. 4. Egg.

Fig. 5. Larva.

Fig. 6. Pupa.

Fig. 7. Female midge.

Fig. 8. Male midge.



WEISS—*Monarthropalpus buxi*

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Wanted: Psyche, Vol. VIII, No. 265 (May, 1898); No. 267 (July, 1898); No. 268 (August, 1898); Vol. IX, No. 300 (April, 1901). Address, giving price, Librarian, Stanford University, Cal.

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